WHAT IS CLAIMED IS:

1. An optical information recording medium, which is recorded and reproduced by laser beams from one side, comprising at least two recording layers formed of a phase change material on a substrate,

wherein the recording layers include a first recording layer and a second recording layer from the side on which the laser beams are incident, the first recording layer is included in a first recording medium and the second recording layer is included in a second recording medium,

when a wavelength of a first laser beam with which recording and reproduction are performed with respect to the first recording medium is indicated as $\lambda 1$ (nm), a wavelength of a second laser beam with which the second recording medium is recorded and reproduced as $\lambda 2$ (nm), a light absorptance of the first recording layer in a crystal state as Ac (%), a light absorptance of the first recording layer in an amorphous state as Aa (%), a light transmittance of the first recording medium with the first recording layer being in the crystal state as Tc (%), a light transmittance of the first recording medium with the first recording layer being in the amorphous state as Ta (%), and the relationship between the wavelength $\lambda 1$ and the wavelength $\lambda 2$ is expressed by $10 \leqq |\lambda 1 - \lambda 2| \leqq 120$, the first recording layer has a light absorption ratio Ac/Aa in a predetermined range with respect to the wavelength $\lambda 1$ and the first recording medium satisfies conditions of $Tc \geqq 30$ and $Ta \geqq 30$ with respect to the wavelength $\lambda 2$.

2. The optical information recording medium according to claim 1, wherein when the relationship between the wavelength $\lambda 1$ and the wavelength $\lambda 2$ is expressed by $10 \leqq |\lambda 1 - \lambda 2| \leqq 50$, the first recording layer has a light absorption ratio Ac/Aa in a predetermined range with respect to the wavelength $\lambda 1$ and the first recording medium satisfies conditions of $Tc \geqq 45$ and $Ta \geqq 45$ with respect to the wavelength $\lambda 2$.

3. The optical information recording medium according to claim 1, further comprising a protective layer,

wherein the second recording medium, the first recording medium, and the protective layer are formed on the substrate sequentially, the protective layer has a thickness d1 (μm) in a range of $30 \leqq d1 \leqq 200$, and recording and reproduction are performed with the first and second laser

beams from a side of the protective layer.

4. The optical information recording medium according to claim 1, wherein the first recording medium formed on a first substrate and the second recording medium formed on a second substrate are bonded to each other.

5. The optical information recording medium according to claim 1, wherein recording and reproduction are performed with a first laser beam and a second laser beam emitted from a multiwavelength light source in which a part of an optical waveguide of a second harmonic generation element and an optical waveguide of a semiconductor laser are optically coupled.

6. The optical information recording medium according to claim 1, wherein the wavelength $\lambda 1$ (nm) of the first laser beam is in a range of $390 \leqq \lambda 1 \leqq 520$.

7. The optical information recording medium according to claim 1, wherein a condition of the light absorption ratio $Ac/Aa \geqq 1.0$ in the first recording layer is satisfied with respect to the wavelength $\lambda 1$ (nm) of the first laser beam.

8. The optical information recording medium according to claim 1, wherein the first recording layer contains Ge-Sb-Te.

9. The optical information recording medium according to claim 1, wherein the first recording layer contains Ge-Sb-Te-Sn.

10. The optical information recording medium according to claim 1, wherein the first recording layer has a thickness d2 (nm) in a range of $3 \leqq d2 \leqq 12$.

11. The optical information recording medium according to claim 1, wherein the first recording medium includes at least the first recording layer and a reflective layer formed sequentially on the substrate, and the reflective layer has a thickness d3 (nm) in a range of $2 \leqq d3 \leqq 20$.

12. A method of recording and reproducing with respect to an optical information recording medium including at least two recording layers formed of a phase change material on a substrate from one side using laser beams,

wherein the recording layers include a first recording layer and a second recording layer from the side on which the laser beams are incident, the first recording layer is included in a first recording medium and the second recording layer is included in a second recording medium,

when a wavelength of a first laser beam with which recording and reproduction are performed with respect to the first recording medium is indicated as $\lambda 1$ (nm), and a wavelength of a second laser beam with which the second recording medium is recorded and reproduced as $\lambda 2$ (nm), the relationship between the wavelength $\lambda 1$ and the wavelength $\lambda 2$ is expressed by $10 \leqq |\lambda 1 - \lambda 2| \leqq 120$.

13. The method of recording and reproducing with respect to an optical information recording medium according to claim 12, wherein the relationship between the wavelength $\lambda 1$ and the wavelength $\lambda 2$ is expressed by $10 \leqq |\lambda 1 - \lambda 2| \leqq 50$.

14. The method of recording and reproducing with respect to an optical information recording medium according to claim 12, wherein with respect to an optical information recording medium in which the second recording medium, the first recording medium, and a protective layer are formed on the substrate sequentially and the protective layer has a thickness d1 (μm) in a range of $30 \leqq d1 \leqq 200$, recording and reproduction are performed with the first and second laser beams from a side of the protective layer.

15. The method of recording and reproducing with respect to an optical information recording medium according to claim 12, wherein recording and reproduction are performed with respect to an optical information recording medium in which the first recording medium formed on a first substrate and the second recording medium formed on a second substrate are bonded to each other.

16. The method of recording and reproducing with respect to an optical information recording medium according to claim 12, wherein recording and

reproduction are performed with a first laser beam and a second laser beam emitted from a multiwavelength light source in which a part of an optical waveguide of a second harmonic generation element and an optical waveguide of a semiconductor laser are optically coupled.

17. The method of recording and reproducing with respect to an optical information recording medium according to claim 12, wherein the wavelength $\lambda 1$ (nm) of the first laser beam is in a range of $390 \leqq \lambda 1 \leqq 520$.

18. An optical waveguide device, comprising:

a substrate;

a plurality of optical waveguides formed in the vicinity of a surface of the substrate;

injection parts formed at one end of the optical waveguides; and

emission parts formed on the other end of the optical waveguides,

wherein the plurality of optical waveguides satisfy phase matching conditions different from one another, and

the emission parts of the plurality of optical waveguides are provided at substantially the same position.

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19. The optical waveguide device according to claim 18, wherein the optical waveguides have periodical polarization inversion structures.

20. The optical waveguide device according to claim 19, wherein the optical waveguides are provided with the polarization inversion structures with different periods, respectively.

21. The optical waveguide device according to claim 18, further comprising reflectors at parts of the optical waveguides.

22. The optical waveguide device according to claim 18, wherein a line normal to a surface opposing the substrate in the emission parts of the optical waveguides and the surface of the substrate form an angle of about 45 degrees.

23. The optical waveguide device according to claim 18, wherein the phase matching conditions are those with respect to second harmonics.

24. The optical waveguide device according to claim 18, wherein the phase matching conditions are those with respect to a sum frequency.

25. The optical waveguide device according to claim 18, wherein the optical waveguides are optically coupled partially to one another.

26. An multiwavelength light source, comprising;

a plurality of coherent light sources with different wavelengths; and

an optical waveguide device, including a substrate, a plurality of optical waveguides formed in the vicinity of a surface of the substrate, injection parts formed at one end of the optical waveguides, and emission parts formed on the other end of the optical waveguides, the plurality of optical waveguides satisfying phase matching conditions different from one another, and the emission parts of the plurality of optical waveguides being provided at substantially the same position,

wherein the wavelengths of beams emitted from the coherent light sources are converted by the optical waveguide device.

27. The multiwavelength light source according to claim 26, wherein the coherent light sources are semiconductor lasers and the injection parts of the optical waveguide device and the semiconductor lasers are coupled directly.

28. The multiwavelength light source according to claim 26, wherein the coherent light sources with different wavelengths are multi-stripe semiconductor lasers formed on one substrate.

29. The multiwavelength light source according to claim 26, wherein the coherent light sources have a function for varying wavelengths.

30. The multiwavelength light source according to claim 26, wherein the optical waveguide device includes an electrode structure including electrodes and outputs are modulated by means of the electrodes.

31. An optical system, comprising:

a multiwavelength light source, including a plurality of coherent light sources with different wavelengths and an optical waveguide device, the optical waveguide device including a substrate, a plurality of optical

waveguides formed in the vicinity of a surface of the substrate, injection parts formed at one end of the optical waveguides, and emission parts formed on the other end of the optical waveguides, the plurality of optical waveguides satisfying phase matching conditions different from one another, the emission parts of the plurality of optical waveguides being provided at substantially the same position, and wavelengths of beams from the coherent light sources being converted by the optical waveguide device; and

a focusing optical system.

32. The optical system according to claim 31, further comprising a wavelength filter,

wherein the wavelength filter separates beams from the multiwavelength light source.

33. The optical system according to claim 32, wherein the wavelength filter separates detected lights.

34. The optical system according to claim 31, wherein beams emitted from the multiwavelength light source are subjected to intensity modulations that are different according to their wavelengths.

35. The optical system according to claim 31, further comprising an optical information recording medium recorded and reproduced by laser beams from one side, the optical information recording medium including at least two recording layers formed of a phase change material on a substrate, in which the recording layers include a first recording layer and a second recording layer from the side on which the laser beams are incident, the first recording layer is included in a first recording medium and the second recording layer is included in a second recording medium,

when a wavelength of a first laser beam with which recording and reproduction are performed with respect to the first recording medium is indicated as $\lambda 1$ (nm), a wavelength of a second laser beam with which the second recording medium is recorded and reproduced as $\lambda 2$ (nm), a light absorptance of the first recording layer in a crystal state as Ac (%), a light absorptance of the first recording layer in an amorphous state as Aa (%), a light transmittance of the first recording medium with the first recording layer being in the crystal state as Tc (%), a light transmittance of the first

recording medium with the first recording layer being in the amorphous state as Ta (%), and the relationship between the wavelength λ1 and the wavelength λ2 is expressed by $10 \leqq |\lambda 1 - \lambda 2| \leqq 120$, the first recording layer has a light absorption ratio Ac/Aa in a predetermined range with respect to the wavelength λ1 and the first recording medium satisfies conditions of $Tc \geqq 30$ and $Ta \geqq 30$ with respect to the wavelength λ2,

wherein beams from the multiwavelength light source are focused on the optical information recording medium by the focusing optical system.

36. The optical system according to claim 35, wherein in the optical information recording medium, when the relationship between the wavelength λ1 and the wavelength λ2 is expressed by $10 \leqq |\lambda 1 - \lambda 2| \leqq 50$, the first recording layer has a light absorption ratio Ac/Aa in a predetermined range with respect to the wavelength λ1 and the first recording medium satisfies conditions of $Tc \geqq 45$ and $Ta \geqq 45$ with respect to the wavelength λ2.

37. The optical system according to claim 35, wherein in the optical information recording medium, the second recording medium, the first recording medium, and a protective layer are formed on the substrate sequentially, the protective layer has a thickness d1 (μm) in a range of $30 \leqq d1 \leqq 200$, and recording and reproduction are performed with the first and second laser beams from a side of the protective layer.

38. The optical system according to claim 35, wherein in the optical information recording medium, the first recording medium formed on a first substrate and the second recording medium formed on a second substrate are bonded to each other.

39. The optical system according to claim 35, wherein in the optical information recording medium, recording and reproduction are performed with the first and second laser beams emitted from the multiwavelength light source in which a part of an optical waveguide of a second harmonic generation element and an optical waveguide of a semiconductor laser are optically coupled.

40. The optical system according to claim 35, wherein the wavelength λ1

(nm) of the first laser beam is in a range of $390 \leqq \lambda 1 \leqq 520$.

41. The optical system according to claim 35, wherein in the optical information recording medium, a condition of the light absorption ratio $Ac/Aa \geqq 1.0$ in the first recording layer is satisfied with respect to the wavelength $\lambda 1$ (nm) of the first laser beam.

42. The optical system according to claim 35, wherein the first recording layer in the optical information recording medium contains Ge-Sb-Te.

43. The optical system according to claim 35, wherein the first recording layer in the optical information recording medium contains Ge-Sb-Te-Sn.

44. The optical system according to claim 35, wherein in the optical information recording medium, the first recording layer has a thickness d2 (nm) in a range of $3 \leqq d2 \leqq 12$.

45. The optical system according to claim 35, wherein the first recording medium in the optical information recording medium includes at least the first recording layer and a reflective layer formed sequentially on the substrate, and the reflective layer has a thickness d3 (nm) in a range of $2 \leqq d3 \leqq 20$.

46. The optical system according to claim 35, wherein the optical information recording medium is recorded or reproduced simultaneously with beams with a plurality of wavelengths from the multiwavelength light source.

47. The optical system according to claim 35, wherein the optical information recording medium is recorded with at least one beam with a wavelength from the multiwavelength light source and simultaneously information is detected from the optical information recording medium with a beam with another wavelength from the multiwavelength light source.

48. The optical system according to claim 47, wherein based on signals detected by the beam with another wavelength from the multiwavelength light source, intensity of the at least one beam with a wavelength is

controlled.

49. The optical system according to claim 47, wherein based on signals detected by the beam with another wavelength from the multiwavelength light source, a focal point on the optical information recording medium of the at least one beam with a wavelength is controlled.

50. The optical system according to claim 47, wherein beams with a plurality of wavelengths from the multiwavelength light source are mixed, with which the optical information recording medium is recorded.